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EXAMINER	
JUNTIMA, NITTAYA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/728,466	BELADAKERE ET AL.	
	Examiner	Art Unit	
	NITTAYA JUNTIMA	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-10 and 13-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-10, and 13-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the RCE filed on 6/5/2008.

2. Claims 1, 4-10, and 13-22 are pending.

3. Claims 20 and 21 are rejected under 35 U.S.C. 112, second paragraph.

4. Claims 1, 4-10, and 13-22 are currently rejected under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 20, it is unclear why the packet-switched fabric in line 1 would comprise another packet-switched fabric having a Clos network configuration as recited in line 2. In view of the specification, the Office is interpreting the limitation "wherein…configuration" as "wherein maintaining the packet-switched fabric comprises maintaining the packet-switched fabric that has a Clos network configuration."

In claim 21, similar to claim 20, it is unclear why the packet-switched switching fabric in line 1 would comprise another packet-switched switching fabric having a Clos network configuration as recited in line 2. In view of the specification, the Office is interpreting the

limitation "wherein…configuration" as "wherein the packet-switched switching fabric has a Clos network configuration."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 1, 5-10, and 14-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record, Personick (US 2002/0191588 A1) in view of another art of record, Best (US 7,218,637 B1).

Regarding **claim 1**, Personick teaches a method for operating a switching node (a core switch 28 in Fig. 1), comprising:

Maintaining a packet-switched fabric (a core switch 28) that switches TDM traffic (circuit switched packets) and packet-based traffic (packet switched packets) (a core switch 28 for switching circuit switched packets and packet switched packets is maintained in network 10 as shown in Fig. 1, Abstract, paragraphs 0025 and 0033).

Overlaying the packet-switching of the fabric (a core switch 28) with a repeating synchronized frame (a periodically repeating signal cycle of period T having N time slots, Fig. 2), the frame to allocate timeslots for switching the TDM traffic and the packet-based traffic (a quantity of time slots per cycle is reserved for circuit switched packets for each link 24 and

empty time slot(s) is used for transmitting packet switched packets, see paragraphs 0031 and 0042; see also Fig. 5).

Maintaining a timeslot-reservation database for TDM traffic (network controller 30 shown in Fig. 1 maintains a database containing the quantity of the time slots and specific slots allocated to each circuit switched circuits on each of the TDM links 24, paragraphs 0030 and 0038).

Prescheduling switching of the fabric by populating the database according to a contention-free allocation to provide exclusive reservation of timeslots in the frame for cells of TDM traffic (the number of time slots per cycle per circuit reserved in the database for circuit switched packets according to a time slot allocation and path selection algorithm carried out by the network controller 30, Fig. 1 must be contention free in order to meet the required throughput specified in a circuit request, paragraphs 0030-0031, 0038, and 0045-0048).

Switching both the TDM traffic and the packet-based traffic over the packet-switched fabric traffic in accordance with the repeating synchronized frame, including transmitting a cell on a timeslot in accordance with the populated database (paragraphs 0038-0039 and Fig. 5).

However, Personick fails to explicitly teach a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a frame, populating the entries in the table to a contention-free allocation for TDM traffic, and transmitting cell on a time slot according to the populated table as claimed.

In an analogous art of a non-blocking data switching system that supports both TDM traffic and packet traffic (Abstract and col. 7, lines 12-14), Best teaches a schedule shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame, wherein the TDM data is transmitted time slots according to the schedule, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27 (equivalent to a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a frame, populating the entries in the table to a contention-free allocation for TDM traffic, and transmitting cell on a time slot according to the populated table).

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to modify the teaching of Personick by incorporating a table format of Best into the database of Personick such that the database would be in a form of a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a frame, and the steps of populating the entries in the table to a contention-free allocation for TDM traffic and transmitting cell on a time slot according to the populated table would be included as claimed. The suggestion/motivation to do so would have been to utilize the database in a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic, and such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

Regarding **claim 5**, although Personick teaches a central management (the network controller 30, Fig. 1 implemented as a centralized network management system) that manages

the database for TDM traffic for each of the TDM links 24 connecting multiple switch interface devices (the transitional switches 26 and core switches 28) in a system (Fig. 1) (paragraphs 0030, 0032, and 0038), Personick does not explicitly teach maintaining the table with the central management that manages tables of the multiple switch interface devices in the system.

Best teaches a core scheduler 13, Fig. 1 that maintains a schedule shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame and is responsible for determining and distributing a non-blocking schedule for the entire system, col. 5, lines 36-46, col. 6, lines 11-36, and col. 8, lines 15-27 (equivalent to maintaining the table with the central management that manages tables of the multiple switch interface devices in the system).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Best into Personick such that the central management would maintain the table and manage tables of multiple switch interface devices in the system as claimed. The suggestion/motivation to do so would have been to enable the core scheduler (equivalent to the central management) to be responsible for determining and distributing a non-blocking schedule (equivalent to the tables) for the entire system as taught by Best (col. 8, lines 20-23).

Regarding **claim 6**, Personick teaches transmitting circuit switched packets from multiple input transitional switches 26, Fig. 1, each according to a populated database, to avoid arbitration

of the TDM traffic via the scheduler 48, Fig. 3 at a core switch 28, paragraphs 0038-0039, 0048-0049.

However, Personick fails to teach that each of the transmission of circuit switched packets is according to a populated table.

Best teaches transmitting TDM data according to a schedule shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27 (equivalent to transmitting circuit switched packets according to a populated table).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to further modify the teaching of Personick to incorporate a table of Best into the database of Personick such that each of the transmission of circuit switched packets would be according to a populated table as claimed. The suggestion/motivation to do so would have been to utilize the database in a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic, and such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

Regarding **claim 7**, Personick also teaches providing a synchronization signal to demark the frame (since the cycle (i.e., frame) and slot timing on links 24 are synchronized by a synchronization system, paragraph 0042, a synchronization signal to demark the frame must be provided).

Regarding **claim 8**, Personick also teaches providing distributed switching of TDM traffic from multiple sources of TDM traffic over the fabric (core switch 28 is connected to multiple sources of circuit switched traffic via input transitional switches 26 in Fig. 1, paragraphs 0024-0025).

Regarding **claim 9**, as shown in Fig. 5, Personick teaches:

Preventing PDU traffic (packet switched packets) from being transmitted on a timeslot that is reserved for TDM traffic (circuit switched packets) (step 122, core switch 28 prevents packet switched packets from being transmitted in time slots reserved for and contain circuit switched packets, paragraph 0051 and claim 6).

Determining whether an egress device has bandwidth that is not reserved for TDM traffic by TDM timeslot reservations (step 122, core switch 28 must determine whether the selected outgoing link 24 connected to an output switch 26b has empty time slot for transmitting packet switched packet(s) to an output switch 26b before transmitting in step 124, paragraph 0051 and claim 6).

Transmitting PDU traffic to the egress device if the egress device has available bandwidth that does not contend with the TDM traffic reservations as a result of the determination (step 124, core switch 28 transmits packet switched packet(s) in a time slot(s) which has not been reserved for circuit switched data on the selected outgoing link 24, paragraph 0051 and claim 6).

Although Personick teaches populating a database (paragraphs 0030-0031 and 0045-0048), Personick fails to explicitly teach populating a TDM timeslot reservation table.

Best teaches populating a schedule shown in Fig. 3 for TDM traffic, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27 (equivalent to populating a TDM timeslot reservation table).

Given the teaching of Best, it would have been obvious to one skilled in the art at the time the invention was made to further modify the teaching of Personick to include the step of populating a TDM timeslot reservation table as claimed. The suggestion/motivation to do so would have been to utilize the populated database in a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic, and such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

Regarding **claim 10**, as shown in Fig. 1, Personick teaches a switching system (network 10) comprising:

A packet-switched fabric (core switch 28) that switches TDM traffic and packet-based traffic (core switch 28 for switching packet switched data comprising circuit switched packets and packet switched packets is maintained in network 10 as shown in Fig. 1, Abstract, paragraphs 0025 and 0033).

Multiple switch interfaces (transitional switches 26) having a timeslot-reservation database containing timeslots on a frame (a cycle), the frame to allocate timeslots for switching the TDM traffic and the packet-based traffic to preschedule switching of the fabric by populating the database according to a contention-free allocation to provide exclusive reservation of timeslots in the frame for cells of TDM traffic, the multiple switch interfaces to transmit cells of

traffic in accordance with the database (implemented as a combination of centralized and distributed management systems, each transitional switch 26 having a distributed network controller 30 populates a database containing allocation of time slots reserved for each of the circuit switched circuits on each TDM links and enables empty time slot(s) to be used for transmitting packet switched packets, paragraphs 0030-0032, 0038-0039, and Fig. 5).

A switch management circuit to define the frame and synchronize switching of traffic over the fabric that switches both the TDM traffic and the packet-based traffic in accordance with the frame (network controller 30 and synchronization system 32 constitute a switch management circuit, Abstract, paragraphs 0030-0032 and 0042).

However, Personick fails to explicitly teach a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a frame, populating the entries in the table to a contention-free allocation for TDM traffic, and transmitting cells of traffic in accordance with the entries in the table as claimed.

In an analogous art of a non-blocking data switching system that supports both TDM traffic and packet traffic (Abstract and col. 7, lines 12-14), Best teaches a schedule shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame, wherein the TDM data is transmitted time slots according to the schedule, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27 (equivalent to a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a

frame, populating the entries in the table to a contention-free allocation for TDM traffic, and transmitting cells of traffic in accordance with the entries in the table).

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to modify the teaching of Personick to incorporate a table format of Best into the database of Personick such that the database would be in a form of a timeslot-reservation table having a row of entries for populating, wherein each entry corresponding to a timeslot of a frame, populating the entries in the table to a contention-free allocation for TDM traffic, and transmitting cells of traffic in accordance with the entries in the table as claimed. The suggestion/motivation to do so would have been to utilize the database in a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic. In addition, such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

Claims 14 and 16 contain similar limitations as disclosed in claims 7 and 9, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 7 and 9, respectively.

Regarding **claim 15**, Personick also teaches that the multiple switch interfaces (transitional switches 26) are directly inter-connectable for system input to system output via the timeslots on the frame synchronized by the switched management circuit (network controller 30

and synchronization system 32, collectively, constitute a switch management circuit). See paragraphs 0024, 0030-0032, and 0042.

Regarding **claim 17**, Personick also teaches that the switch fabric (core switch 28, Fig. 3) comprises multiple discrete switching circuits (a packet router 46 and a time divided-space switch 45, paragraphs 0033-0034 and 0036).

Regarding **claim 18**, it is inherent in Personick that the multiple switch interfaces (input transitional switches 26, Figs. 1, 4A, and 4B) must comprise multiple ingress/egress linecards for receiving the traffic and transmitting the traffic to/from the network 10 (paragraphs 0024, 0040-0041).

Regarding **claim 19**, Personick teaches a switch management linecard having a circuit to generate a synchronization signal (a switch management linecard reads on a synchronization system 32, Fig. 1 which must have a circuit to generate a synchronization/timing signal, paragraph 0042) and a circuit to provide management of the database (a circuit reads on network controller 30, paragraphs 0030-0032).

Personick fails to teach the table as claimed.

However, Best teaches the schedule (equivalent to the table), col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27.

Given the teaching of Best, it would have been obvious to implement the database of Personick in a form a table so the table would be included as claimed. The

suggestion/motivation to do so would have been to manage the database having a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic. In addition, such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

8. **Claims 4 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record, Personick (US 2002/0191588 A1) in view of another art of record, Best (US 7,218,637 B1), and further in view of another art or record, McCrosky (US 6,876,650 B2).

Regarding **claims 4 and 22**, the combined teaching of Personick and Best does not explicitly teach providing a contention-free allocation in time and space of TDM traffic using a Slepian-Duguid-based algorithm as claimed.

However, McCrosky teaches using a Slepian-Duguid-based algorithm in time and space switching fabric for TDM switching of signals (col. 1, lines 11-40).

Given the teaching of McCrosky, it would have been obvious to one skilled in the art at the time the invention was made to further modify the combined teaching of Personick and Best such that a contention-free allocation in time and space of TDM traffic using a Slepian-Duguid-based algorithm as claimed. The suggestion/motivation to do so would have been to schedule connections in rearrangeably non-blocking switches that always succeeds on loads of up to 100% capacity as suggested by McCrosky (col. 1, lines 26-28 and 39-40).

9. **Claims 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record, Personick (US 2002/0191588 A1) in view of another art of record, Best (US 7,218,637 B1), and further in view of Vishnu (US 7,187,672 B1).

Regarding **claims 20 and 21**, the modified teaching of Personick and Best does not teach the packet-switched switching fabric that has a Clos network configuration.

However, Vishnu teaches a Clos network (m,n,r) as shown in Fig. 1B (col. 2, lines 52-56).

Since Personick teaches the packet-switched switching fabric (a core switch 28 for switching circuit switched packets and packet switched packets is maintained in network 10 as shown in Fig. 1, Abstract, paragraphs 0025 and 0033) that has a time divided-space switch 45which is a time-space-time type of switch as shown in Fig. 3 (paragraphs 0033 and 0036), it would have been obvious to one skilled in the art at the time the invention was made to further modify the combined teaching of Personick and Best to replace the time divided-space (KxL) switch 45, Fig. 3 with a Clos network such that the packet-switched switching fabric would have a Clos network configuration. The suggestion/motivation to do so would have been to provide the system with an equivalent Clos network that is rearrangeably nonblocking when $m \geq n$ (Vishnu, col. 2, lines 52-56, 67-col. 3, lines 5).

Response to Arguments

10. Applicant's arguments filed 6/5/2008 have been fully considered but they are not persuasive.

A. In the remarks, the applicant argues that the database of Personick does not read on the claimed "timeslot-reservation table for TDM traffic."

In response, it is respectfully submitted that Personick alone does not teach a timeslot-reservation table for TDM traffic as claimed.

However, Personick teaches a timeslot reservation database for TDM traffic:

"*The network controller 30 maintains a database containing the quantity of the time slots which are reserved for each of the circuit switched circuits on each of the TDM communication links 24*" (emphasis added, paragraph 0030), and

"*the specific time slots allocated to each circuit onto which the circuit switched packets are to be consigned by the time divided-space switch 45 on each outgoing communication link 24 from the core switch 28 may be determined by the network controller 30 and assigned to each scheduler 48 in the setup signal*" (paragraph 0038).

What Personick does not explicitly teach is the table format. Best teaches a schedule (equivalent to a timeslot-reservation table) shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame, wherein the TDM data is transmitted time slots according to the schedule, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate a table format of Best into the database of Personick in order to produce a timeslot-reservation table as claimed. The suggestion/motivation to do so would have been to utilize the database in a tabular format to systematically keep track of the timeslots reserved/scheduled for TDM traffic, and such modification of implementing a database in a tabular format involves only routine skill in the art and would not yield any unexpected results.

B. In the remarks, the applicant argues that Personick does not teach prescheduling switching of a packet-switched fabric that switches TDM and packet-based traffic by entries in the table because Personick requires the use of a schedule which is in contrast to the prescheduling provided by the timeslot reservation table as recited in the independent claims.

In response, Examiner respectfully disagrees. Personick clearly teaches a packet-switched fabric (a core switch 28, Fig. 1) that switches TDM traffic (circuit switched packets) and packet-based traffic (packet switched packets) (Abstract, paragraphs 0025 and 0033).

And notably, the time divided-space switch 45 is controlled/scheduled by the scheduler 48 which in turn is controlled by a set up signal from the network controller 30 (paragraph 0037). However, the prescheduling switching of the fabric is actually provided by the time slots reservation database for TDM traffic -- (i) the database contains the quantity of the time slots which are reserved for each of the circuit switched circuits on each of the TDM communication links 24 (paragraph 0030), (ii) when the network controller 30 receives a circuit request, it examines the database for the TDM links 24 that can provide the required number of the time slots per cycle (paragraph 0031), and (iii) the specific time slots allocated to each circuit onto which the circuit switched packets are to be consigned on each outgoing link 24 from the core switch 28 is determined by the network controller 30 in the setup signal (paragraph 0038).

Best teaches the table with entries (a schedule shown in Fig. 3 for non-blocking TDM data transfer in the system having rows of entries corresponding to time slots of a frame, col. 6, lines 11-36, col. 7, lines 32-37, and col. 8, lines 15-27).

Therefore, it is respectfully submitted that the combined teaching of Personick and Best teaches prescheduling switching of the fabric by entries in the table as claimed.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NITTAYA JUNTIMA whose telephone number is (571)272-3120. The examiner can normally be reached on Monday through Friday, 8:00 A.M - 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on 571-272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nittaya Juntima/
Primary Examiner, Art Unit 2616
7/14/2008